Compliance Assurance Monitoring Plan
Baghouse C120
Atlas Resin Proppants, L.L.C., Taylor, Wisconsin

I. Background

A. Emissions Unit

Description:	Elevator #11, Conveyor #12, Elevator #12, Day Tank, Weigh Hopper #11, Raw Material Heater, Cyclone, Shaker Screen, Elevator #14, Scalping Screen, Product Cooler, Elevator #15, Finished Silo #11, Finished Silo #12, Finished Silo #13, Conveyor #13, Elevator #16, and Weigh Belt. Constructed 2008.
Identification:	Processes P113, P116, P117, P121-P124, P141-P148, and P161-P163; Control Device C120; Stack S120
Facility:	Atlas Resin Proppants, L.L.C. Taylor, Wisconsin

B. Applicable Regulation, Emissions Limit, and Monitoring Requirements

Regulation:	Permit No. 627005280-P02, Condition I.I.1.a.(1), NR 404.08(2), and NR 415.05(1)(m) or 415.05(2), Wisconsin Administrative Code
Emissions Limit:	
Particulate Matter (PM):	1.0 lb/hr
Monitoring Requirements:	The pressure drop across the baghouse control device shall be measured and recorded once every 8 hours of operation. The pressure drop across the baghouse control device shall be maintained between 1 and 8 inches water column.

C. Control Technology

17,000 actual cubic feet per minute (ACFM) baghouse using woven polyester fabric filters and a pulse jet cleaning system.

Compliance Assurance Monitoring Plan
Baghouse C120
Atlas Resin Proppants, L.L.C., Taylor, Wisconsin

II. Monitoring Approach

The key elements of the monitoring approach for PM are presented in Table 2. The selected performance indicator is pressure drop.

A. Background

Two polymer resin-coated sand manufacturing plants (Towers A and B) are operated at this facility. In each plant, heated sand and resin are mixed with a small amount of additives in the Batch Mixer. An aqueous additive solution may be added to the Batch Mixer to cross-link the melted resin and begin cooling the coated sand. Each Batch Mix is 2,500 to 3,000 pounds, and the plant processes approximately 12 batches per hour. Each batch is discharged into a Continuous Mixer, which is designed to keep the process flowing as discrete particles until the product has cooled. The Continuous Mixer converts the batch process into a continuous process. A packed bed wet scrubber controls emissions, primarily phenol, from each mixing process. The baghouse collects PM from the raw sand and finished product handling in each process in the form of silica and resin dust.

B. Rationale for Selection of Performance Indicator

The pressure drop is routinely checked and recorded in order to ensure proper baghouse operation. Pressure drop was selected as the performance indicator because it is indicative of good operation and maintenance of the baghouse.

In general, baghouses are designed to operate at a relatively constant pressure drop. Monitoring pressure drop provides a means of detecting a change in operation that could lead to an increase in emissions. An increase in pressure drop can indicate that the cleaning cycle is not frequent enough, cleaning equipment is damaged, the bags are becoming blinded, or the airflow has increased. A decrease in pressure drop may indicate broken or loose bags. A pressure drop across the baghouse also serves to indicate that there is sufficient airflow through the control device.

C. Rationale for Selection of Indicator Range

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A pressure drop indicator range of 1 to 8 inches of water column was selected in accordance with the operating history and stack test results for Baghouse C120. Stack test data show that PM emissions are well below the emissions limit at a pressure drop in the middle of the selected indicator range. Test runs were performed on March 17–19, 2009.

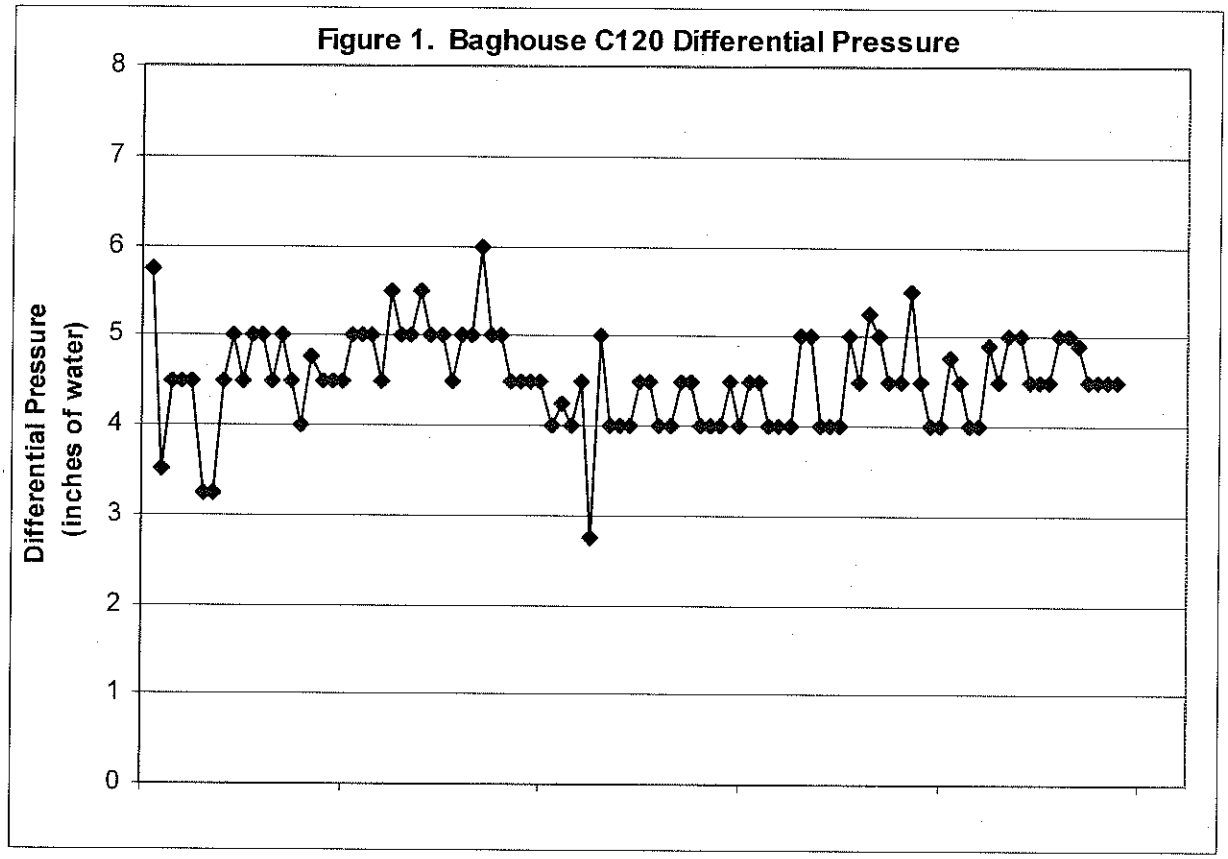
Table 1
Stack Test Results

TEST RUN	VOLUMETRIC FLOW RATE (dscfm)[1]	ISOKINETIC RATIO (%)	PARTICULATE EMISSIONS (lb/hr)	PRESSURE DROP (in. of H_2O)
1	11,149	100.3	0.175	5.0
2	11,624	100.8	0.345	5.0
3	11,917	100.8	0.356	5.0
Average	**11,563**		**0.29**	**5.0**
Limitation			1.0	1.0-8.0

Note:
[1] dscfm = dry standard cubic feet per minute.

Figure 1 shows approximately 40 days worth of pressure drop data. The pressure drop indicator range was selected in accordance with these data. As exhibited in Figure 1, the pressure drop typically remains between 1 and 8 inches of water for normal operation. If an excursion is recorded, then the facility will schedule a maintenance check of the baghouse.

Compliance Assurance Monitoring Plan
Baghouse C120
Atlas Resin Proppants, L.L.C., Taylor, Wisconsin



Compliance Assurance Monitoring Plan
Scrubber C150
Atlas Resin Proppants, L.L.C., Taylor, Wisconsin

I. Background

A. Emissions Unit

Description:	Batch Mixer, Continuous Mixer and Sludge Tank. Constructed 2008.
Identification:	Processes P151-P153; Control Device C150; Stack S150.
Facility:	Atlas Resin Proppants, L.L.C. Taylor, Wisconsin

B. Applicable Regulation, Emissions Limit, and Monitoring Requirements

Regulation:	Permit No. 627005280-P02, Condition I.J.1.(a)(1), I.J.3.a.(1), and I.J.4.a.(3). NR 404.08(2) and NR 415.05(1)(m) or 415.05(2); NR 424.03(2)(c), Wis. Adm. Code; and s. 285.65(7), Wis. Stats.
Emission Limits:	
Particulate Matter (PM):	1.5 lb/hr
Volatile Organic Compounds (VOCs):	11.0 lb/hr or 64% overall control efficiency
Phenol:	3.3 lb/hr or 54.5% overall control efficiency for phenol, or 64% overall control efficiency for VOC
Monitoring Requirements:	The pressure drop across the wet scrubber and demister (in inches of water column), the wet scrubber liquor flow (in gallons per minute or as otherwise described below), and the pH of the wet scrubber absorbing fluid shall be measured and recorded once every 8 hours of operation. The pressure drop across the wet scrubber and demister shall be maintained between 8 and 17 inches water column, or an alternative range approved in writing by the. As an alternative to measuring the

liquor flow in gallons per minute, at least once every 8 hours of operation, Atlas shall conduct a documented visual inspection to confirm return flow to the sludge tank, coupled with monitoring and recording the motor power of the scrubber liquor recirculation pump.

C. Control Technology

A packed bed scrubber, including a venturi, a demister, and a recirculating tank.

II. Monitoring Approach

The key elements of the monitoring approach for PM, VOC and phenol are presented in Table 1. The selected performance indicators are monitoring the wet scrubber and demister pressure drop, the wet scrubber liquor flow and the pH of the wet scrubber.

A. Background

Two polymer resin-coated sand manufacturing plants (Towers A and B) are operated at this facility. In each plant, heated sand and resin are mixed with a small amount of additives in the Batch Mixer. An aqueous additive solution may be added to the Batch Mixer to cross-link the melted resin and begin cooling the coated sand. Each Batch Mix is 2,500 to 3,000 pounds, and the plant processes approximately 12 batches per hour. Each batch is discharged into a Continuous Mixer, which is designed to keep the process flowing as discrete particles until the product has cooled. The Continuous Mixer converts the batch process into a continuous process. A packed bed scrubber controls emissions, primarily phenol, from each mixing process. The baghouse collects PM from the raw sand and finished product handling in each process in the form of silica and resin dust.

B. Rationale for Selection of Performance Indicators

The pressure drop, pH and flow are routinely checked and recorded to ensure proper scrubber and demister performance. These were selected as performance indicators because they are indicative of good operation and maintenance of the scrubber.

Pressure drop was also selected as a performance indicator because it indicates the liquid level in the scrubber. Maintaining an adequate liquid flow ensures adequate

particulate removal. A high pressure drop indicates that the liquid level in the scrubber is too high. Usually, high liquid level problems are caused by a malfunction of the scrubber liquid level controller. A low pressure drop is caused by a loss of liquid in the scrubber.

To ensure compliance with the applicable emissions limit, a minimum scrubbing liquid flow rate must be supplied to the scrubber to absorb a given amount of phenol in the gas stream, given the size of the tower and the height of the packed bed. The liquid to gas (L/G) ratio is a key operating parameter of the scrubber. If the L/G ratio decreases below the minimum, sufficient mass transfer of the pollutant from the gas phase to the liquid phase will not occur. The minimum liquid flow required to maintain the proper L/G ratio at the maximum gas flow and vapor loading through the scrubber can be determined. Maintaining this minimum liquid flow, even during periods of reduced gas flow, will ensure that the required L/G ratio is achieved at all times.

As the pH of the scrubbing liquid decreases, the concentration gradient between the liquid and gas decreases and less phenol is absorbed. It is important to maintain a minimum pH of the scrubbing liquid to drive this absorption.

C. Rationale for Selection of Indicator Ranges

Indicator ranges for the scrubber liquid pH and flow rate have been developed based on the manufacturer's design and operating guidelines, the chemistry of the reaction products, and previous experience in operating this scrubber. The selected range for scrubber liquid pH is between 9.5 and 10.2. The selected indicator range for scrubber liquid flow is greater than 45 gallons per minute.

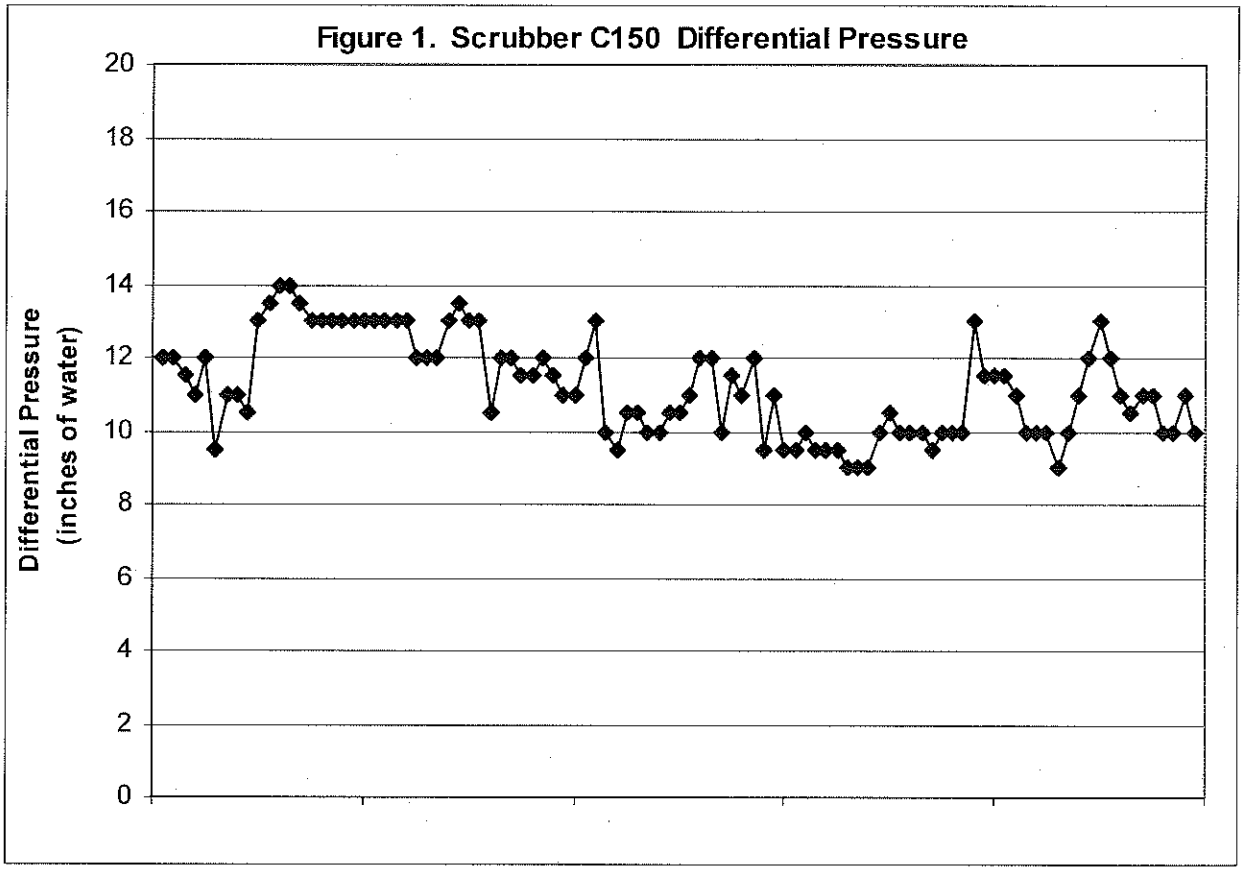
The indicator levels for the scrubber pressure drop are based on operating history and performance test results. Process data results during the stack test are shown in Table 1. These data show the values for differential during the stack test. Test runs were performed on March 17–19, 2009, and show that VOC and phenol mass emission rates were well within emission limits at the turbidity and differential pressures recorded.

Table 1
Stack Test Results

		RUN 1	RUN 2	RUN 3	AVERAGE	LIMITATION
Differential pressure	start	13.4	13.4	12.2	13.0	10-30
	mid	13.2	13.6	12.5	13.1	10-30

(in. of H_2O)	end	13.3	13.2	12.2	12.9	10-30
PM emissions (lb/hr)		0.92	1.31	1.20	1.14	1.5
Phenol emissions (lb/hr)		1.57	0.10	0.61	0.76	3.3
VOC emissions (lb/hr)		5.15	5.17	5.16	5.16	11.0

Figure 1 presents approximately 40 days' worth of differential pressure data. The pressure drop indicator range of 8 to 17 inches of water column was selected in accordance with these data and the stack test data. If an exceedence of these levels is recorded, then the facility will schedule a maintenance check of the scrubber system.



Compliance Assurance Monitoring Plan
Baghouse C20
Atlas Resin Proppants, L.L.C., Taylor, Wisconsin

I. Background

A. Emissions Unit

Description:	Elevator #1, Conveyor #2, Elevator #2, Day Tank #1, Day Tank #2, Weigh Hopper #1, Raw Material Heater, Cyclone, Elevator #3, Resin Tank, Weigh Hopper #2, Shaker Screen, Elevator #4, Scalping Screen, Product Cooler, Conveyor #3, Elevator #5, Finished Silo #1, Finished Silo #2, Weigh Belt, Finished Silo #3, and Finished Product Silo #4. Constructed 2005. P72 constructed 2006.
Identification:	Processes P13, P16, P17, P21-P25, P27-P29, P41-P49, P71, and P72; Control Device C20; Stack S20
Facility:	Atlas Resin Proppants, L.L.C. Taylor, Wisconsin

B. Applicable Regulation, Emissions Limit, and Monitoring Requirements

Regulation:	Permit No. 627005280-P02, Condition I.D.1.a.(1), NR 404.08(2), and NR 415.05(1)(m) or 415.05(2), Wisconsin Administrative Code
Emissions Limit:	
Particulate Matter (PM):	1.0 lb/hr
Monitoring Requirements:	The pressure drop across the baghouse control device shall be measured and recorded once every 8 hours of operation. The pressure drop across the baghouse control device shall be maintained between 1 and 8 inches water column.

C. Control Technology

17,000 actual cubic feet per minute (ACFM) baghouse using woven polyester fabric filters and a pulse jet cleaning system.

Compliance Assurance Monitoring Plan
Baghouse C20
Atlas Resin Proppants, L.L.C., Taylor, Wisconsin

II. Monitoring Approach

The key elements of the monitoring approach for PM are presented in Table 2. The selected performance indicator is pressure drop.

A. Background

Two polymer resin-coated sand manufacturing plants (Towers A and B) are operated at this facility. In each plant, heated sand and resin are mixed with a small amount of additives in the Batch Mixer. An aqueous additive solution may be added to the Batch Mixer to cross-link the melted resin and begin cooling the coated sand. Each Batch Mix is 2,500 to 3,000 pounds, and the plant processes approximately 12 batches per hour. Each batch is discharged into a Continuous Mixer, which is designed to keep the process flowing as discrete particles until the product has cooled. The Continuous Mixer converts the batch process into a continuous process. A packed bed wet scrubber controls emissions, primarily phenol, from each mixing process. The baghouse collects PM from the raw sand and finished product handling in each process in the form of silica and resin dust.

B. Rationale for Selection of Performance Indicator

The pressure drop is routinely checked and recorded in order to ensure proper baghouse operation. Pressure drop was selected as the performance indicator because it is indicative of good operation and maintenance of the baghouse.

In general, baghouses are designed to operate at a relatively constant pressure drop. Monitoring pressure drop provides a means of detecting a change in operation that could lead to an increase in emissions. An increase in pressure drop can indicate that the cleaning cycle is not frequent enough, cleaning equipment is damaged, the bags are becoming blinded, or the airflow has increased. A decrease in pressure drop may indicate broken or loose bags. A pressure drop across the baghouse also serves to indicate that there is sufficient airflow through the control device.

C. Rationale for Selection of Indicator Range

A pressure drop indicator range of 1 to 8 inches of water column was selected in accordance with the operating history and stack test results for Baghouse C20. Stack test data show that PM emissions are well below the emissions limit at a pressure drop

in the middle of the selected indicator range. Test runs were performed on March 17–19, 2009.

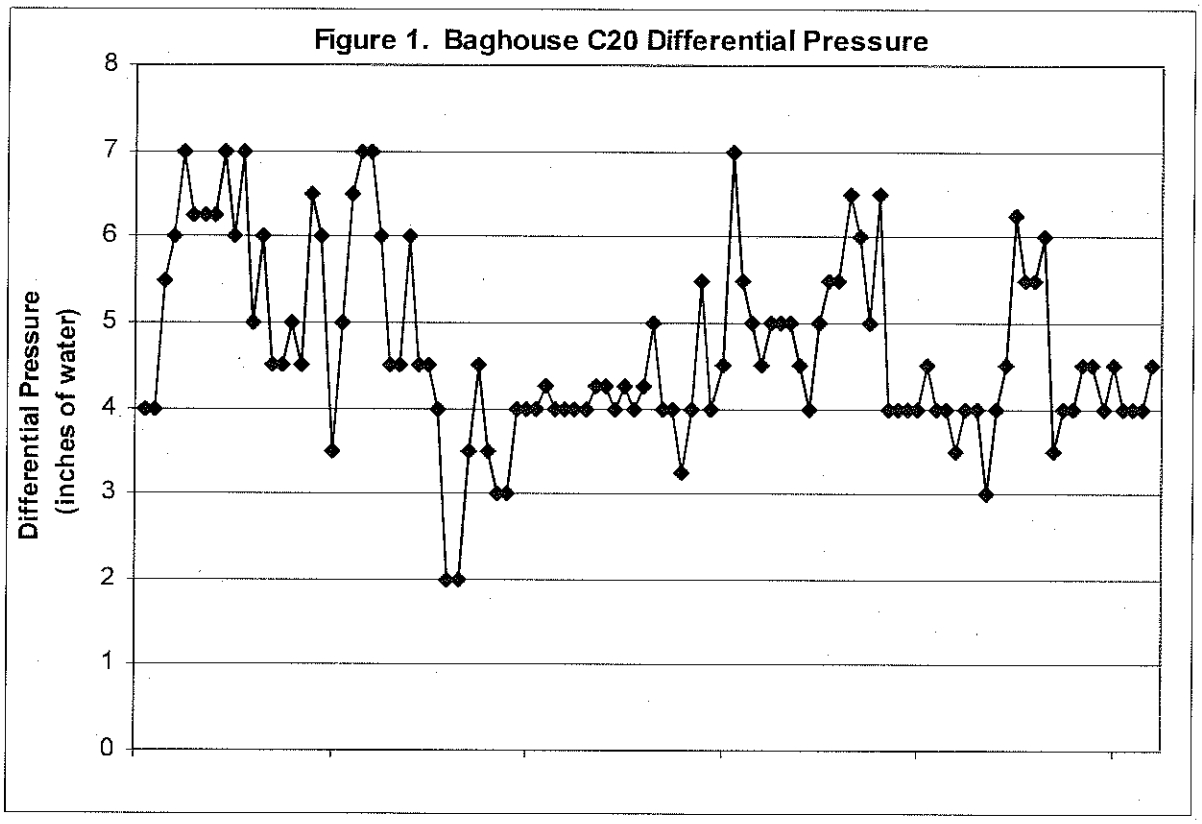
Table 1
Stack Test Results

TEST RUN	VOLUMETRIC FLOW RATE (dscfm)[1]	ISOKINETIC RATIO (%)	PARTICULATE EMISSIONS (lb/hr)	PRESSURE DROP (in. of H_2O)
1	8,571	101.0	0.204	5.0
2	8,490	100.9	0.122	5.0
3	8,394	101.2	0.115	5.0
Average	**8,485**		**0.147**	**5.0**
Limitation			1.0	1.0-8.0

Note:
(1) dscfm = dry standard cubic feet per minute.

Figure 1 shows approximately 40 days' worth of pressure drop data. The pressure drop indicator range was selected in accordance with these data. As exhibited on Figure 1, the pressure drop typically remains between 1 and 8 inches of water for normal operation. If an excursion is recorded, then the facility will schedule a maintenance check of the baghouse.

Compliance Assurance Monitoring Plan
Baghouse C20
Atlas Resin Proppants, L.L.C., Taylor, Wisconsin



Compliance Assurance Monitoring Plan
Scrubber C50

Atlas Resin Proppants, L.L.C., Taylor, Wisconsin

I. Background

A. Emissions Unit

Description:	Batch Mixer, Continuous Mixer and Sludge Tank #1. Constructed 2005.
Identification:	Processes P51-P53; Control Device C50; Stack S50.
Facility:	Atlas Resin Proppants, L.L.C. Taylor, Wisconsin

B. Applicable Regulation, Emissions Limit, and Monitoring Requirements

Regulation:	Permit No. 627005280-P02, Conditions I.E.1.(a)(1), I.E.3.a.(1), and I.E.4.a.(3). NR 404.08(2) and NR 415.05(1)(m) or 415.05(2); NR 424.03(2)(c), Wis. Adm. Code; and s. 285.65(7), Wis. Stats.
Emission Limits:	
Particulate Matter (PM):	1.5 lb/hr
Volatile Organic Compounds (VOCs):	10.6 lb/hr or 64% overall control efficiency
Phenol:	2.8 lb/hr or 54.5% overall control efficiency for phenol, or 64% overall VOC control efficiency
Monitoring Requirements:	The pressure drop across the wet scrubber and demister (in inches of water column), the wet scrubber liquor flow (in gallons per minute or as otherwise described below) and the pH of the wet scrubber absorbing fluid shall be measured and recorded once every 8 hours of operation. The pressure drop across the wet scrubber and demister shall be maintained between 8 and 17 inches water column or an alternative range approved in writing by the Department. As an alternative to measuring the liquor flow in gallons per minute, at least once every 8 hours of operation, Atlas shall conduct a

documented visual inspection to confirm return flow to the sludge tank, coupled with monitoring and recording the motor power of the scrubber liquor recirculation pump.

C. Control Technology

A packed bed scrubber, including a venturi, a demister, and a recirculating tank.

II. Monitoring Approach

The key elements of the monitoring approach for PM, volatile organic compounds (VOCs), and phenol are presented in Table 1. The selected performance indicators are monitoring the scrubber and demister pressure drop, the scrubber liquor flow and the pH of the scrubber liquor.

A. Background

Two polymer resin-coated sand manufacturing plants (Towers A and B) are operated at this facility. In each plant, heated sand and resin are mixed with a small amount of additives in the Batch Mixer. An aqueous additive solution may be added to the Batch Mixer to cross-link the melted resin and begin cooling the coated sand. Each Batch Mix is 2,500 to 3,000 pounds, and the plant processes approximately 12 batches per hour. Each batch is discharged into a Continuous Mixer, which is designed to keep the process flowing as discrete particles until the product has cooled. The Continuous Mixer converts the batch process into a continuous process. A packed bed scrubber controls emissions, primarily phenol, from each mixing process. The baghouse collects PM from the raw sand and finished product handling in each process in the form of silica and resin dust.

B. Rationale for Selection of Performance Indicators

The pressure drop, pH and flow are routinely checked and recorded to ensure proper scrubber and demister performance. These were selected as performance indicators because they are indicative of good operation and maintenance of the scrubber.

Pressure drop was also selected as a performance indicator because it indicates the liquid level in the scrubber. Maintaining an adequate liquid flow ensures adequate particulate removal. A high pressure drop indicates that the liquid level in the scrubber

is too high. Usually, high liquid level problems are caused by a malfunction of the scrubber liquid level controller. A low pressure drop is caused by a loss of liquid in the scrubber.

To ensure compliance with the applicable emissions limits, a minimum scrubbing liquid flow rate must be supplied to the scrubber to absorb a given amount of phenol in the gas stream, given the size of the tower and the height of the packed bed. The liquid to gas (L/G) ratio is a key operating parameter of the scrubber. If the L/G ratio decreases below the minimum, sufficient mass transfer of the pollutant from the gas phase to the liquid phase will not occur. The minimum liquid flow required to maintain the proper L/G ratio at the maximum gas flow and vapor loading through the scrubber can be determined. Maintaining this minimum liquid flow, even during periods of reduced gas flow, will ensure that the required L/G ratio is achieved at all times.

As the pH of the scrubbing liquid decreases, the concentration gradient between the liquid and gas decreases and less phenol is absorbed. It is important to maintain a minimum pH of the scrubbing liquid to drive this absorption.

C. Rationale for Selection of Indicator Ranges

Indicator ranges for the scrubber liquid pH and flow rate have been developed based on the manufacturer's design and operating guidelines, the chemistry of the reaction products, and previous experience in operating this scrubber. The selected range for scrubber liquid pH is between 9.5 and 10.2. The selected indicator range for scrubber liquid flow is greater than 45 gallons per minute.

The indicator levels for the scrubber pressure drop are based on operating history and performance test results. Process data results during the stack test are shown in Table 1. These data show the values for differential pressure during the stack test. Test runs were performed on May 4, 2006, and show that VOC and phenol mass emission rates were well within emission limits at the turbidity and differential pressures recorded.

Table 1
Stack Test Results

		RUN 1	RUN 2	RUN 3	AVE	LIMITATION
Differential pressure (in. of H2O)	start	15.5	16.0	16.0	16.0	10-30
	mid	16.0	16.0	16.0	16.0	10-30
	end	16.0	16.0	16.0	16.0	10-30

PM emissions (lb/hr)	1.06	1.30	1.16	1.17	1.5
Phenol emissions (lb/hr)	1.32	1.56	1.69	1.63	2.8
VOC emissions (lb/hr)	2.19	2.48	2.48	2.38	10.6

Figure 1 presents approximately 40 days' worth of differential pressure data. The pressure drop indicator range of 8 to 17 inches of water column was selected in accordance with these data and the stack test data. If an exceedence of these levels is recorded, then the facility will schedule a maintenance check of the scrubber system.